

PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

REC'D 09 MAY 2006

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(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P06471PC00	FOR FURTHER ACTION See Form PCT/IPEA/416	
International application No. PCT/SE2004/000265	International filing date (day/month/year) 27-02-2004	Priority date (day/month/year) 22-12-2003
International Patent Classification (IPC) or national classification and IPC See Supplemental Box		
Applicant Telefonaktiebolaget L M Ericsson (publ) et al		

- This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
- This REPORT consists of a total of 5 sheets, including this cover sheet.
- This report is also accompanied by ANNEXES, comprising:
 - ☒ (sent to the applicant and to the International Bureau) a total of 2 sheets, as follows:
 - ☐ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
 - ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
 - ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

- This report contains indications relating to the following items:

- | | | |
|-------------------------------------|--------------|---|
| <input checked="" type="checkbox"/> | Box No. I | Basis of the report |
| <input type="checkbox"/> | Box No. II | Priority |
| <input type="checkbox"/> | Box No. III | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability |
| <input type="checkbox"/> | Box No. IV | Lack of unity of invention |
| <input checked="" type="checkbox"/> | Box No. V | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <input type="checkbox"/> | Box No. VI | Certain documents cited |
| <input type="checkbox"/> | Box No. VII | Certain defects in the international application |
| <input type="checkbox"/> | Box No. VIII | Certain observations on the international application |

Date of submission of the demand 21-10-2005	Date of completion of this report 11-04-2006
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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/SE2004/000265

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of: Cover sheet

INTERNATIONAL PATENT CLASSIFICATION (IPC) :

H04L 12/56 (2006.01)

H04L 29/06 (2006.01)

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

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Box No. I Basis of the report

1. With regard to the
- language**
- , this report is based on:

- ☐ the international application in the language in which it was filed
- ☐ a translation of the international application into _____ ,
which is the language of a translation furnished for the purposes of:
- ☐ international search (Rules 12.3(a) and 23.1(b))
- ☐ publication of the international application (Rule 12.4(a))
- ☐ international preliminary examination (Rules 55.2(a) and/or 55.3(a))

2. With regard to the
- elements**
- of the international application, this report is based on (
- replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*
-):

- ☐ the international application as originally filed/furnished
- ☒ the description:
pages 1 - 12 _____ as originally filed/furnished
pages* _____ received by this Authority on _____
pages* _____ received by this Authority on _____
- ☒ the claims:
pages 1 3 _____ as originally filed/furnished
pages* _____ as amended (together with any statement) under Article 19
pages* 14 - 15 received by this Authority on 23 - 12 - 2005
pages* _____ received by this Authority on _____
- ☒ the drawings:
pages 1 - 4 _____ as originally filed/furnished
pages* _____ received by this Authority on _____
pages* _____ received by this Authority on _____
- ☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

- 3.
- ☐
- The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to the sequence listing (*specify*): _____

- 4.
- ☐
- This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to the sequence listing (*specify*): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/SE2004/000265

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	<u>1-12</u>	YES
	Claims		NO
Inventive step (IS)	Claims	<u>1-12</u>	YES
	Claims		NO
Industrial applicability (IA)	Claims	<u>1-12</u>	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

The object of the invention is to solve the problems of controlling middleboxes with a midcom agent which occurs when a packet stream is a mobile packet stream

Reference is made to the following documents:

D1: EP1315359 A2

D2: US 20030123388 A1

D3: Network Working Group, Request for Comments: 3304, August 2002

Document D1 relates to a method of controlling one of a plurality of middleboxes in a communications network.

D2 relates to a method and apparatus for admissions control in a connectionless communications network. D2 is regarded as prior art and will therefore not be mentioned any more.

D3 This document specifies the requirements that the Middlebox Communication (midcom) protocol must satisfy in order to meet the needs of applications wishing to influence the middlebox function.

Claims 1-12:

From D1 (see paragraphs 5, 29, 41-51), it is known to send a set-up message from a first terminal (i.e. a mobile terminal) through one or more middleboxes. The middleboxes adds its own identity to the set-up message before the message is forwarded to the call.

.../...

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of: BOX V

server, the call server uses the identities for controlling the middleboxes (to set-up required bindings). The result of the bindings is then passed to the second terminal, and the same process is operated in the other direction.

However, The cited documents represent the general state of the art.

The invention defined in claims 1-12 is not disclosed by any of these documents.

The cited prior art does not give any indication that would lead a person skilled in the art to the claimed method, agent and system, wherein a mobile flow registers its presence in a middlebox and a middlebox that in response to such a registration, signals the identity of the mobile flow and the identity of the middlebox to a central controller.

Therefore, the claimed invention is not obvious to a person skilled in the art.

Accordingly, the invention defined in claims 1-12 is novel and is considered to involve an inventive step. The invention is industrially applicable.

6. A method in accordance with claim 1 **characterized by** the midcom agent uses a routing table to send the control messages to the respective middleboxes on the IP control plane using an extended midcom protocol.
7. A method in accordance with claim 1 **characterized by** the midcom agent sends the control messages to the middleboxes by first sending them to the ingress middlebox (IN) from which they are sent in the same channel as the user data.
8. A method in accordance with claim 1, wherein a domain (22; 23) comprises middleboxes and a midcom agent (15; 21) controlling these **characterized by**
- forwarding control messages from one domain to another by having an ingress middlebox, sitting the edge of a network which an individual flow enters,
 - filtering out control messages and tunnelling them to the midcom agent,
 - and the midcom agent forwarding them to an egress middlebox at which the flow exits the network.
9. A method in accordance with claim 8 **characterized by** exchanging step c. for the step of returning the signalling message to the ingress middlebox (IN) from where it is forwarded along same path as the user data flow.
10. A method in accordance with claim 1 **characterized by** several midcom agents (15, 21), provided at the IP control plane, simultaneously controlling one and the same flow.
11. A midcom agent **characterized by** a plurality of control function sets, each set relating to the operation of an individual middlebox, and comprising control orders for control of the operation of the corresponding middlebox according to the method claimed in claim 1.
12. A communication system comprising a plurality of IP based networks (38, 42, 44, 45, 48) and a session controller (2) for set up of a communication path that traverses selected one of the networks, each selected network having an ingress middlebox (IN) at which a user flow enters the network and an egress middlebox (EN) at which the flow exits the network, **characterized by** each network comprising a midcom agent (15; 21) sitting at an IP control plane (4), a plurality of middleboxes (13, 14, 23, 24) sitting at an IP user plane (6), an extended midcom protocol allowing for communication between the midcom agent and the middleboxes, said middleboxes being adapted to detect a user flow and register its identity (FID) at the midcom

agent together with the identity of the middlebox at which the flow was detected (16;
28, 29), said midcom agent in response to a combined flow and middlebox
registration sending a flow control order (17) to the middlebox over the extended
midcom protocol, said flow control order instructing the middlebox how to handle
the detected flow.

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